

WHAT IS CLAIMED IS:

- Sub
v1
1. A method for detecting duplicate images comprising the steps of:
 - providing at least two images captured at determinable times;
 - computing an indication of image content for each image;
 - determining the time of capture of each of the images; and
 - evaluating the indication of image content and the time of capture to determine whether the images are duplicate images.
 2. The method as claimed in claim 1 wherein the step of computing an indication of image content comprises:
 - dividing each image into blocks; and
 - computing an indication of image content in each block.
 3. The method as claimed in claim 2 wherein each image is divided into 4x4 or fewer blocks.
 4. The method as claimed in claim 3 wherein each image is divided into 3x3 blocks.
 5. The method as claimed in claim 2 wherein the step of computing an indication of image content in each block comprises computing a histogram for each block.
 6. The method as claimed in claim 5 wherein the step of evaluating the indication of image content and the time of capture comprises comparing one or more blocks of one image, using a histogram intersection metric, to corresponding blocks of another image and using the time difference between capture of the two images to determine whether the images are duplicate images.

7. The method as claimed in claim 1 wherein the step of computing an indication of image content comprises:

dividing each image into blocks, wherein one or more blocks represent a foreground area of the images; and

computing an indication of image content in each block and in the foreground areas of each image.

8. A method for detecting duplicate images comprising the steps of:

(a) providing a plurality of images captured at determinable times;

(b) dividing each image into an X number of blocks, wherein one or more blocks represent a central area and a foreground area;

(c) computing histograms for each block of each image, and block histogram intersection values obtained from comparisons between histograms from corresponding blocks from each image;

(d) determining whether each block histogram intersection value for at least those blocks surrounding the central area is higher than a threshold T_1 , and determining whether the number of intersection values below the threshold T_1 are not greater than a certain number N;

(e) computing an average histogram intersection value of the foreground area, and determining whether the average block histogram intersection value of the foreground area is not lower than a threshold T_2 ;

(f) determining whether the average histogram intersection value of the foreground is higher than a threshold T_3 ;

(g) determining whether an average of the X number of block histogram intersection values is higher than a threshold T_4 ;

(h) determining whether the average of the X number of block histogram intersection values is higher than a threshold T_5 ;

(i) determining whether the time difference between capture of the images is less than a threshold T_6 ;

(j) determining whether the average of the X number of block histogram intersection values is higher than a threshold T_7 ; and

- (k) determining whether the time difference between the capture of the images is less than a threshold T_8 ; and
- (l) utilizing the determinations made in steps (d) through (k) to determine if any of the images are duplicates.

9. The method as recited in claim 8 wherein said step (h) further provides that $T_5 < T_4$.

10. The method as recited in claim 8 wherein said step (j) further provides that $T_5 < T_4 < T_7$.

11. The method as recited in claim 8 wherein said step (k) further provides that $T_6 < T_8$.

12. The method as recited in claim 8 wherein said step (b) comprises dividing each image into a configuration of 4x4 or fewer blocks.

13. The method as recited in claim 12 wherein said step (b) comprises dividing each image into a configuration of 3x3 blocks.

14. A method for detecting duplicate images comprising the steps of:

- (a) providing a plurality of images;
- (b) dividing each image into an X number of blocks, wherein one or more blocks represent a central area and a foreground area;
- (c) computing histograms for each block, and block histogram intersection values obtained from comparisons between histograms from corresponding blocks from each image;
- (d) determining whether each block histogram intersection value for at least those blocks surrounding the center block is higher than a threshold T_1 , and determining whether the number of intersection values below the threshold T_1 are not greater than a certain number N;

- (e) computing an average histogram intersection value of the foreground area, and determining whether the average block histogram intersection value of the foreground area is not lower than a threshold T_2 ;
- (f) determining whether the average histogram intersection value of the foreground is higher than a threshold T_3 ;
- (g) determining whether an average of the X number of block histogram intersection values is higher than a threshold T_4 ;
- (h) determining whether the average of the X number of block histogram intersection values is higher than a threshold T_5 ; and
- (i) utilizing the determinations made in steps (d) through (h) to determine if any of the images are duplicates.

15. The method as recited in claim 14 wherein said step (h) further provides that $T_5 < T_4$.

16. The method as recited in claim 14 wherein said step (b) comprises dividing each image into a configuration of 4x4 or fewer blocks.

17. The method as recited in claim 16 wherein said step (b) comprises dividing each image into a configuration of 3x3 blocks.

18. A computer program product for detecting duplicate images comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of:
providing at least two images captured at determinable times;
computing an indication of image content for each image;
determining the time of capture of each of the images; and
evaluating the indication of image content and the time of capture to determine whether the images are duplicate images.

19. The computer program product as claimed in claim 18 wherein the step of computing an indication of image content comprises:
dividing each image into blocks; and

computing an indication of image content in each block.

20. The computer program product as claimed in claim 19 wherein each image is divided into 4x4 or fewer blocks.

21. The computer program product as claimed in claim 20 wherein each image is divided into 3x3 blocks.

22. The computer program product as claimed in claim 19 wherein the step of computing an indication of image content in each block comprises computing a histogram for each block.

23. The computer program product as claimed in claim 22 wherein the step of evaluating the indication of image content and the time of capture comprises comparing one or more blocks of one image, using a histogram intersection metric, to corresponding blocks of another image and using the time difference between capture of the two images to determine whether the images are duplicate images.

24. The computer program product as claimed in claim 18 wherein the step of computing an indication of image content comprises:

dividing each image into blocks, wherein one or more blocks represent a foreground area of the images; and

computing an indication of image content in each block and in the foreground areas of each image.